Vasectomy update 2010

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1. Preoperative counselling

Vasectomy is a safe and effective method of birth control. Although vasectomy is a relatively simple procedure, it is associated with potential minor and major complications. As such, detailed preoperative counselling is required. Failure to provide and document adequate preoperative information and counselling may lead to litigation. Men must be told of the potential for early complications, such as wound infection, scrotal hematoma and primary surgical failure and late complications, including painful vas granulomas, chronic epididymal pain and delayed vasectomy failure. Such information should be given both verbally and in writing. Surgeons should report their own complication rates, whenever possible. The association between vasectomy and prostate disease (cancer) may be discussed if patients voice a concern. The potential reversibility of the procedure should also be discussed.

Most men are potentially fertile shortly after the vasectomy. Moreover, in cases of early recanalization or technical failure (e.g., missed vas deferens), men will remain fertile. Therefore, couples must be instructed to use other contraceptive measures until post-vasectomy semen testing has confirmed the absence of motile sperm.

2. Vasectomy technique (approach and occlusion)

Conventional vs. no scalpel vasectomy: Grade A-B (Level 1-2 evidence)

The 2 most common surgical techniques for accessing the vas during vasectomy are the traditional incisional method and the no-scalpel vasectomy (NSV) technique. The conventional incisional technique involves the use of a scalpel to make 1 or 2 incisions and the NSV technique uses a sharp, forceps-like instrument to puncture the skin; the latter approach aims to reduce adverse events (e.g., bleeding, infection and pain).

A recent Cochrane review of 2 randomized controlled trials indicates that the NSV is associated with a significantly lower risk of postoperative hematoma (Odds ratio [OR]: 0.20 [0.13, 0.32]), pain during surgery (OR: 0.75 [0.61, 0.93]), postoperative scrotal pain (OR: 0.63 [0.50, 0.80]), and wound infection (OR: 0.21 [0.06, 0.78]), than the standard incision group.[1,2,3] Based on the same review, NSV is a faster procedure than conventional surgery. However, there was no significant difference in the effectiveness (azoospermic or absence of motile sperm) of the 2 procedures.

Fascial interposition vs. no fascial interposition: Grade B (Level 2 evidence)

In a randomized controlled trial of over 800 vasectomies, it was shown that the use of fascial interposition during vasectomy is associated with a significantly higher rate of azoospermia at 3 months (OR: 0.42 [0.26, 0.70]) than no interposition.[4,5,6] However, fascial interposition may increase the complication rate of vasectomy.[7]

Cautery vs. fascial interposition: Grade C (Level 3 evidence)

In a comparative, case-control study, cautery of the vas was associated with a lower risk of failure (defined as >100 000 sperm in the ejaculate) than fascial interposition (1% vs. 4.9%, OR: 4.8 [1.6-14.3]).[8]

Intra-vas device vs. NSV: Grade B (Level 2 evidence)

In a randomized controlled trial of close to 300 vasectomies, the use of an intra-vas device during vasectomy was associated with a significantly lower rate of achieving azoospermia at 3 months (OR: 0.14 [0.06, 0.29]) than with the NSV.[4,9] However, patients reported less postoperative pain with the intra-vas device than with the NSV.

3. Contraceptive efficacy of vasectomy

The early failure rate of vasectomy (i.e., the presence of motile sperm in the ejaculate at 3 to 6 months post-vasectomy) ranges from 0.3% to 9% and has been linked to operator experience and the technique used by the surgeon.[7] Both technical failure (e.g., missed vas deferens) and early

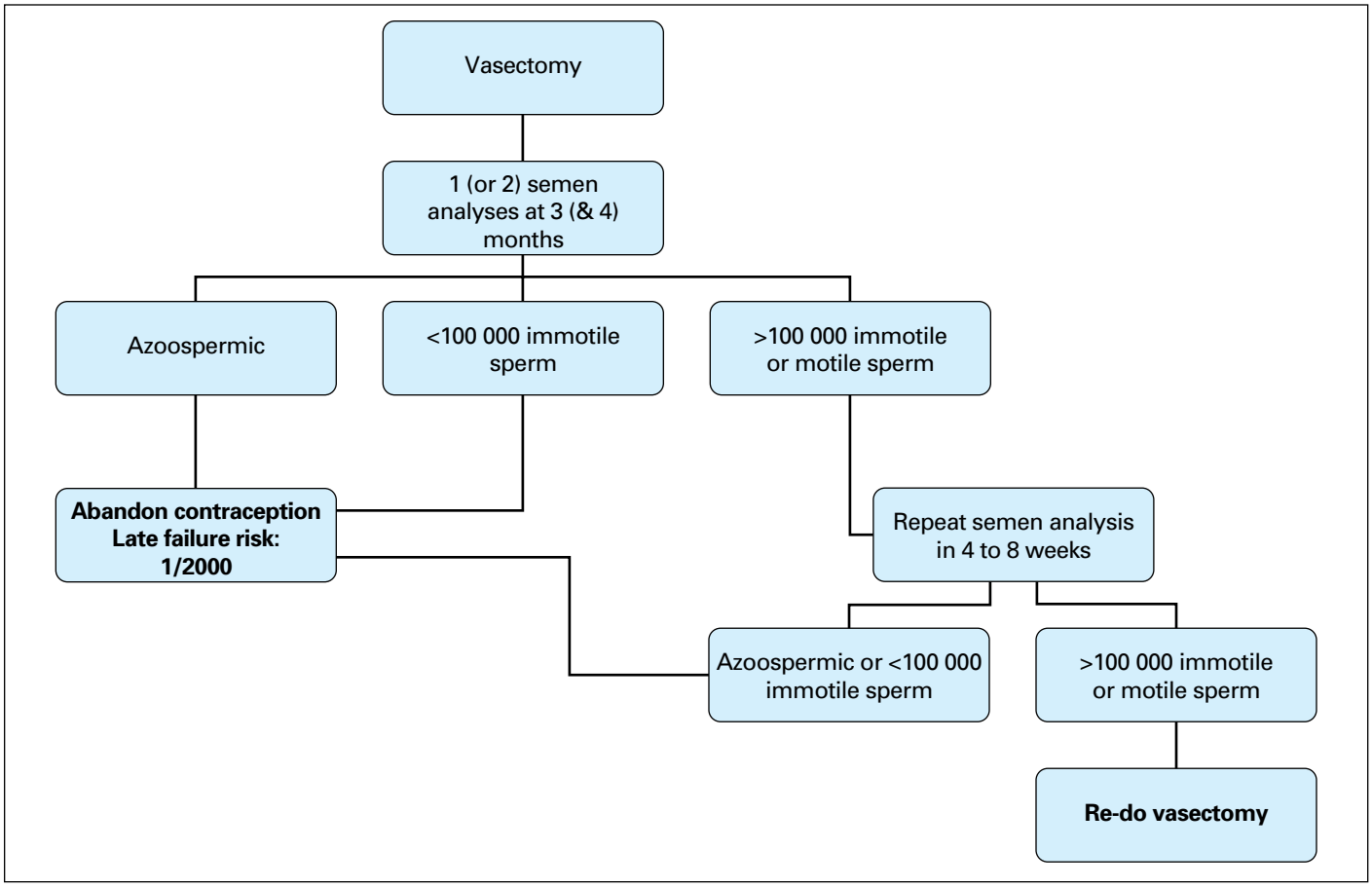

Fig. 1. Proposed algorithm for post-vasectomy testing protocol.

re-canalization of the vas deferens have been proposed as plausible explanations.

Late failure has been reported to be in the range of 0.04% to 0.08% (about 1/2000 cases) and is defined as the presence of motile spermatozoa in the ejaculate after documented azoospermia in 2 post-vasectomy semen analyses.[10,11] In most cases, late failure is first identified as a pregnancy and later confirmed by semen analysis (documenting the presence of motile spermatozoa).

The reappearance of sperm (mostly immotile) after documented azoospermia in 2 post-vasectomy semen samples may be much higher than 1/2000, according to the reported identification of spermatozoa in nearly 10% of ejaculates from men undergoing semen assessment prior to vasectomy reversal.[12] It is unlikely that the reappearance (or persistence) of immotile sperm years after vasectomy is of clinical significance, as this has not been associated with documented pregnancies.[13,14]

4. Postoperative counselling

After the vasectomy has been performed, men should be instructed about proper wound and scrotal care and short-term physical limitations. Men should be told how to collect the semen sample (completeness, type of container) and should be reminded of the importance of submitting the sample to the laboratory in a timely fashion (within 30 to 60 minutes after producing the sample). They should also be told that semen samples should be collected after an abstinence period of 2 or more days and no more than 7 days, and maintained at body temperature before delivery to the laboratory. A list of local laboratories that perform proper post-vasectomy semen analysis should be given to the patient. The men must be reminded to use other contraceptive measures until the post-vasectomy semen testing has confirmed the absence of motile sperm.

5. Post-vasectomy semen testing

The post-vasectomy semen analysis should be performed on the whole (unprocessed) semen and on the centrifuged semen to confirm the absence of low numbers of motile sperm. The laboratory should give an estimation of sperm concentration or numbers of spermatozoa observed per high power field (× 400 magnification).

It is important to recognize that compliance with post-

vasectomy semen testing is a significant issue with up to 30% of men failing to submit a single sample.[15,16]

1 vs. 2 post-vasectomy samples: Grade C (Level 3 evidence)

Surveys have shown significant variability in the post-vasectomy testing protocols.[17] Most agree that a single azoospermic semen sample is sufficient to deem the vasectomy effective.[18,19] However, because spermatozoa are detected in 10% to 40% of the 3-month post-vasectomy samples (the percentage depends on the vasectomy technique and the accuracy of the semen analysis), it may be necessary for up to 40% of the men to submit a second semen sample.[7,20] As such, requesting 2 semen samples at the onset may be more efficient as this may reduce the number of post-vasectomy counselling sessions (e.g., phone calls or office visits), but this may also reduce the overall compliance.[16]

Timing of post-vasectomy testing: Grade C (level 3 evidence)

Although most studies suggest that post-vasectomy testing be conducted at 3 months after the vasectomy, the issue remains debatable; some studies suggest earlier examinations (with determination of failure based on the presence of motile sperm) and others propose later examinations.[16,21,22] The difficulty in establishing a set time point for semen testing stems largely from the variable success of the vasectomy occlusion techniques.[7] Azoospermia is achieved much later with the ligation (and excision) compared with the cautery or fascial interposition techniques.[7,20,21] The argument in favour of waiting at least 3 months is that this will reduce the number of false positive samples and minimize the need for repeat laboratory assessment and counselling.[22]

6. Interpreting and communicating results

Azoospermia or rare immotile sperm (<100 000 per ejaculate) as an indication of successful vasectomy: Grade C (Level 3 evidence)

Contraceptive measures may be abandoned after the men have produced 1 azoospermic or 1 ejaculates with rare (<100 000) immotile spermatozoa. It is the physician's responsibility (not the laboratory's) to communicate these results to the patient; measures should be taken to ensure that patients are not lost to follow-up (e.g., follow-up phone calls to remind patients). Physicians must also remind couples about the risk of late failure (about 1/2000) despite azoospermia or rare immotile sperm on initial testing.

It is estimated that about 20% to 40% of samples have rare non-motile sperm at 3 months post-vasectomy, with a lower percentage having non-motile sperm at 6 months.[15,20] When there is doubt regarding the analysis, physicians may want to contact the laboratory and confirm that there was no reporting error (i.e., that the sample was incorrectly labelled as "non-motile"). The literature has suggested that the risk of pregnancy occurring from these non-motile sperm is small, perhaps no more than the risk of late pregnancy after 2 azoospermic semen samples, as a result of spontaneous re-canalization.[13,14] Similarly, rare non-motile sperm can appear in the ejaculate 1 or more years after vasectomy with no increased risk of failure (pregnancy or motile sperm). Therefore, repeat semen testing in men with rare non-motile sperm is unnecessary because pregnancy is very unlikely to occur in this setting.

Motile sperm or large numbers of immotile sperm as a measure of failure: Grade C (Level 3 evidence)

If any motile sperm or substantial numbers of immotile spermatozoa (>100 000) are detected, the physician must inform the patient to continue the use of other contraceptive measures and request that a repeat semen analysis be performed. A repeat vasectomy is indicated when there is persistence of motile sperm or large numbers of non-motile sperm in the ejaculate. However, no long-term studies have evaluated the risk of pregnancy in this setting.

Summary

Vasectomy is a safe and effective method of birth control. The NSV technique is associated with a lower risk of early postoperative complications and the use of cautery or fascial interposition will reduce the risk of contraceptive failure. Post-vasectomy testing should consist of examination of 1 or 2 semen samples at about 3 (and 4 months) after vasectomy. The laboratory should examine a freshly produced seminal fluid specimen by direct microscopy and if no sperm are seen, the centrifuged sample should be examined for the presence of motile and non-motile spermatozoa. Other contraceptive measures may be abandoned after the production of 1 azoospermic ejaculate or 2 consecutive ejaculates with fewer than 100 000 immotile spermatozoa. Couples must be counselled (both preoperatively and postoperatively) about the risks of early and late failure.

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References

1. Cook LA, Pun A, van Vliet H, et al. Scalpel versus no-scalpel incision for vasectomy. *Cochrane Database Syst Rev* 2007;18:CD004112.
2. Christensen P, al-Aqidi OA, Jensen FS, et al. Vasectomy. A prospective, randomized trial of vasectomy with bilateral incision versus the Li vasectomy. *Ugeskrift for laeger* 2002;164:2390-4.
3. Sokal D, McMullen S, Gates D, et al. A comparative study of the no scalpel and standard incision approaches to vasectomy in 5 countries. The Male Sterilization Investigator Team. *J Urol* 1999;162:1621-5.
4. Cook LA, van Vliet H, Lopez LM, et al. Vasectomy occlusion techniques for male sterilization. *Cochrane Database Syst Rev*. 2007;18:CD003991.
5. Sokal D, Irsula B, Hays M, et al. Vasectomy by ligation and excision, with or without fascial interposition: a randomized controlled trial. *BMC Med* 2004;2:6.
6. Chen-Mok M, Bangiwala SI, Dominik R, et al. Termination of a randomized controlled trial of two vasectomy techniques. *Controlled Clin Trials* 2003;24:78-84.
7. Labrecque M, Nazerali H, Mondor M, et al. Effectiveness and complications associated with 2 vasectomy occlusion techniques. *J Urol* 2002;168:2495-8.
8. Sokal D, Irsula B, Chen-Mok M, et al. A comparison of vas occlusion techniques: cautery more effective than ligation and excision with fascial interposition. *BMC Urol* 2004;4:12.
9. Song L, Gu Y, Lu W, et al. A phase II randomized controlled trial of a novel male contraception, an intra-vas device. *Int J Androl* 2006;29:489-95.
10. Philp T, Guillebaud J, Budd D. Late failure of vasectomy after two documented analyses showing azoospermic semen. *Br Med J (Clin Res Ed)* 1984;289:77-9.
11. Haldar N, Cranston D, Turner E, et al. How reliable is a vasectomy? Long-term follow-up of vasectomised men. *Lancet* 2000;356:43-4.
12. Lemack GE, Goldstein M. Presence of sperm in the pre-vasectomy reversal semen analysis: incidence and implications. *J Urol* 1996;155:167-9.
13. Davies AH, Sharp RJ, Cranston D, et al. The long-term outcome following 'special clearance' after vasectomy. *Br J Urol* 1990;66:211-2.
14. De Knijff DW, Vrijhof HJ, Arends J, et al. Persistence or reappearance of nonmotile sperm after vasectomy: does it have clinical consequences? *Fertil Steril* 1997;67:332-5.
15. Chawla A, Bowles B, Zini A. Vasectomy follow-up: clinical significance of rare nonmotile sperm in the post-op semen analysis. *Urology* 2004;64:1212-5.
16. Bodiwala D, Jeyarajah S, Terry TR, et al. The first semen analysis after vasectomy: timing and definition of success. *BJU Int* 2006;99:727-8.
17. Haws JM, Morgan GT, Pollack AE, et al. Clinical aspects of vasectomies performed in the United States in 1995. *Urology* 1998;52:685-91.
18. Badrakumar C, Gogoi NK, Sundaram SK. Semen analysis after vasectomy: when and how many? *BJU Int* 2000;86:479-81.
19. Griffin T, Tooher T, Nowakowski K, et al. How little is enough? The evidence for post-vasectomy testing. *J Urol* 2005;174:29-36.
20. Barone M, Nazerali H, Cortes M, et al. A prospective study of time and number of ejaculations to azoospermia after vasectomy by ligation and excision. *J Urol* 2003;170:892-6.
21. Edwards IS. Earlier testing after vasectomy, based on the absence of motile sperm. *Fertil Steril* 1993;59:431-6.
22. Labrecque M, St.-Hilaire K, Turcot L. Delayed vasectomy success in men with a first post-vasectomy semen analysis showing motile sperm. *Fertil Steril* 2005;83:1435-41.

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